Ecoregions of Indiana and Ohio

Ecoregions denote areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources; they are designed to serve as a spatial framework for the research, assessment, management, and monitoring of ecosystems and ecosystem components. Ecoregions are directly applicable to the immediate needs of state agencies including the development of biological criteria and water quality standards as well as the establishment of management goals for nonpoint-source pollution. They are also relevant to integrated ecosystem management, an ultimate goal of most federal and state resource management agencies.

The approach used to compile this map is based on the premise that ecological regions can be identified through the analysis of the patterns and the composition of biotic and abiotic phenomena that affect or reflect differences in ecosystem quality and integrity (Wiken 1986; Omernik 1987, 1995). These phenomena include geology, physiography, vegetation, climate, soils, land use, wildlife, and hydrology. The relative importance of each characteristic varies from one ecological region to another regardless of the hierarchical level. A Roman numeral hierarchical scheme has been adopted for different levels of ecological regions. Level I is the coarsest level, dividing North America into 15 ecological regions, with level II dividing the continent into 52 regions. At level III, the continental United States contains 99 regions (United States Environmental Protection Agency [USEPA], 1997). Level IV is a further subdivision of level III ecoregions. Explanations of the methods used to define the USEPA's ecoregions are given in Omernik (1995), Griffith and others (1994), and Gallant and others (1989).

This level III and IV ecoregion map was compiled at a scale of 1:250,000; it depicts revisions and subdivisions of earlier level III ecoregions that were originally compiled at a smaller scale (USEPA 1997; Omernik 1987). The poster is part of a collaborative project primarily between the USEPA Region V, the USEPA National Health and Environmental Effects Research Laboratory, Corvallis, Oregon, the Indiana Department of Environmental Management (IDEM), the Ohio Department of Natural Resources (ODNR), the Ohio Environmental Protection Agency (Ohio EPA), the United States Department of Agriculture - Forest Service (USFS), the United States Department of Agriculture - Natural Resources Conservation Service (NRCS) (formerly the Soil Conservation Service), and the United States Department of the Interior - U.S. Geological Survey (USGS) - Earth Resources Observation Systems (EROS) Data Center.

This project is associated with an interagency effort to develop a common framework of ecological regions. Reaching that objective requires recognition of the differences in the conceptual approaches and mapping methodologies that have been used to develop the most commonly used existing ecoregion-type frameworks, including those developed by the USFS (Bailey and others, 1994), the USEPA (Omernik 1987, 1995), and the NRCS (U.S. Department of Agriculture - Soil Conservation Service, 1981). As each of these frameworks is further developed, the differences between them lessen. Regional collaborative projects such as this one in Indiana and Ohio, where agreement can be reached among multiple resource management agencies, is a step in the direction of attaining commonality and consistency in ecoregion frameworks for the entire nation.

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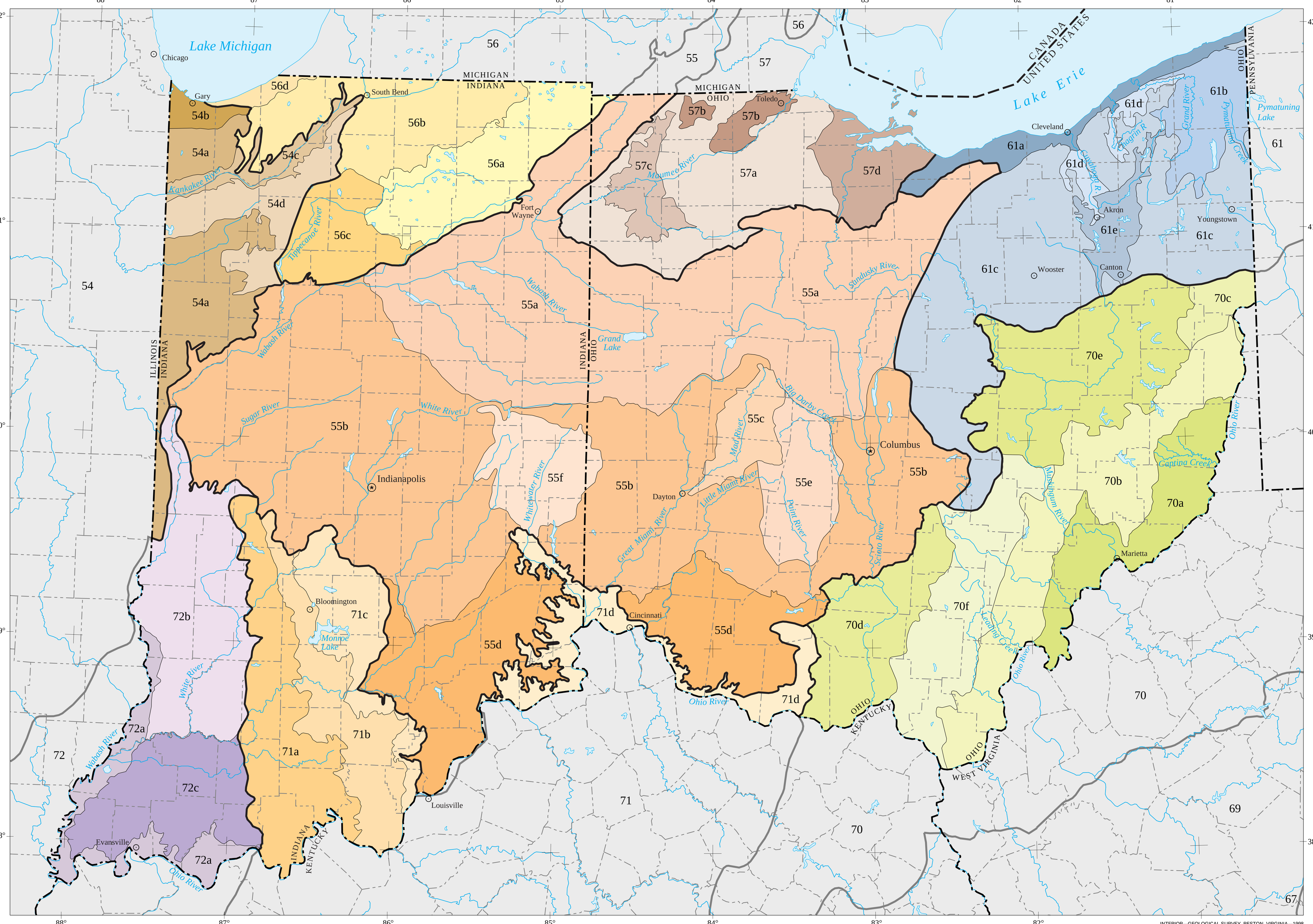


54 Central Corn Belt Plains
- 54a Illinois/Indiana Prairies
- 54b Chicago Lake Plain
- 54c Kankakee Marsh
- 54d Kankakee Sand Area

55 Eastern Corn Belt Plains
- 55a Clayey, High Lime Till Plains
- 55b Loamy, High Lime Till Plains
- 55c Mad River Interlobate Area
- 55d Pre-Wisconsinan Drift Plains
- 55e Darby Plains
- 55f Whitewater Interlobate Area

56 Southern Michigan/Northern Indiana Drift Plains
- 56a Lake Country
- 56b Elkhart Till Plains
- 56c Middle Tippecanoe Plains
- 56d Michigan Lake Plain

57 Huron/Erie Lake Plains
- 57a Maumee Lake Plains
- 57b Oak Openings
- 57c Paulding Plains
- 57d Marblehead Drift/Limestone Plain

61 Erie/Ontario Drift and Lake Plain
- 61a Erie Lake Plain
- 61b Mosquito Creek/Pymatuning Lowlands
- 61c Low Lime Drift Plain
- 61d Erie Gorges
- 61e Summit Interlobate Area

70 Western Allegheny Plateau
- 70a Permian Hills
- 70b Monongahela Transition Zone
- 70c Pittsburgh Low Plateau
- 70d Lower Scioto Dissected Plateau
- 70e Unglaciated Upper Muskingum Basin
- 70f Ohio/Kentucky Carboniferous Plateau

71 Interior Plateau
- 71a Crawford Uplands
- 71b Mitchell Plain
- 71c Norman Upland
- 71d Northern Bluegrass

72 Interior River Lowland
- 72a Wabash Bottomlands
- 72b Glaciated Wabash Lowlands
- 72c Southern Wabash Lowlands

Level III ecoregion
Level IV ecoregion
County boundary
State boundary
International boundary

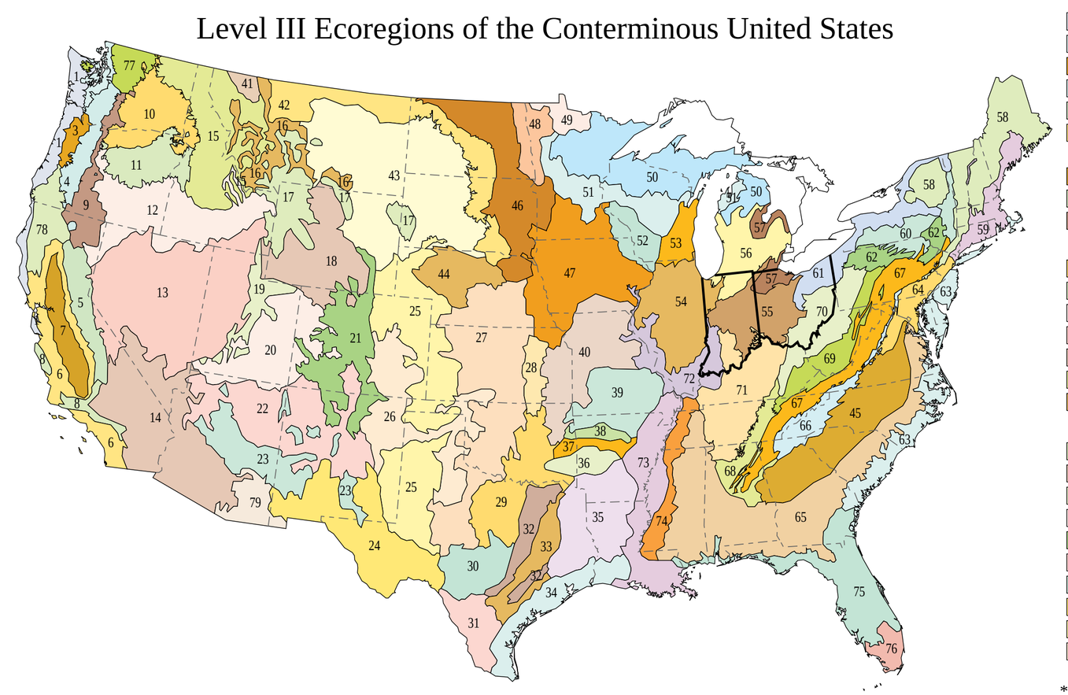
SCALE 1:1 500 000

15 10 5 0 30 60 mi

30 20 10 0 60 120 km

Albers equal area projection
standard parallels 38° 40' N and 41° 20' N

Level III Ecoregions of the Conterminous United States



1 Coast Range
2 Puget Lowland
3 Willamette Valley
4 Cascades
5 Sierra Nevada
6 Southern and Central California Chaparral and Oak Woodlands
7 Central California Valley
8 Southern California Mountains
9 Eastern Cascades Slopes and Foothills
10 Columbia Plateau
11 Blue Mountains
12 Snake River Basin/High Desert
13 Northern Basin and Range
14 Southern Basin and Range
15 Northern Rockies
16 Montana Valley and Foothill Prairies
17 Middle Rockies
18 Wyoming Basin
19 Wasatch and Uinta Mountains
20 Colorado Plateaus
21 Southern Rockies
22 Arizona/New Mexico Plateau
23 Arizona/New Mexico Mountains
24 Southern Deserts
25 Western High Plains
26 Southwestern Tablelands
27 Central Great Plains
28 Flint Hills
29 Central Oklahoma/Texas Plains
30 Edwards Plateau
31 Southern Texas Plains
32 Texas Blackland Prairies
33 East Central Texas Plains
34 Western Gulf Coastal Plain
35 South Central Plains
36 Ouachita Mountains
37 Arkansas Valley
38 Boston Mountains
39 Ozark Highlands
40 Central Irregular Plains
41 Canadian Rockies*
42 Northwestern Glaciated Plains
43 Northwestern Great Plains
44 Nebraska Sand Hills
45 Piedmont*
46 Northern Glaciated Plains
47 Western Corn Belt Plains
48 Lake Agassiz Plain
49 Northern Minnesota Wetlands
50 Northern Lakes and Forests
51 North Central Hardwood Forests
52 Driftless Area
53 Southeastern Wisconsin Till Plains
54 Central Corn Belt Plains
55 Eastern Corn Belt Plains
56 Southern Michigan/Northern Indiana Drift Plains
57 Huron/Erie Lake Plains
58 Northeastern Highlands
59 Northeastern Coastal Zone
60 Northern Appalachian Plateau and Uplands
61 Erie/Ontario Drift and Lake Plain
62 North Central Appalachians
63 Middle Atlantic Coastal Plain
64 Northern Piedmont
65 Southeastern Plains
66 Blue Ridge Mountains
67 Ridge and Valley
68 Southwestern Appalachians
69 Central Appalachians
70 Western Allegheny Plateau
71 Interior Plateau
72 Interior River Lowland
73 Mississippi Alluvial Plain
74 Mississippi Valley Loess Plains
75 Southern Coastal Plain
76 Southern Florida Coastal Plain
77 North Cascades*
78 Klamath Mountains*
79 Madrean Archipelago*

*Level III ecoregions identified in the ecoregion revision and subdivision process subsequent to the original map compilations (Omernik 1987).

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54. Central Corn Belt Plains

Extensive prairie communities were native to the glaciated plains of Ecoregion 54; they were a stark contrast to the hardwood forests that grew farther east on the drift plains of Ecoregions 55 and 56. Beginning in the nineteenth century, the natural vegetation was gradually replaced by agriculture. Farms are now extensive on the dark, fertile soils of Ecoregion 54 and grow, primarily, corn and soybeans; cattle, sheep, poultry, and, especially, hogs are also raised, but they are not as dominant as farther west in the drier Western Corn Belt Plains (47). Agriculture has affected stream chemistry, turbidity, and habitat.


Ecoregion 54a was once prairie. The natural vegetation has been replaced by corn, soybean, and livestock farming. Dark, fertile soils are characteristic.

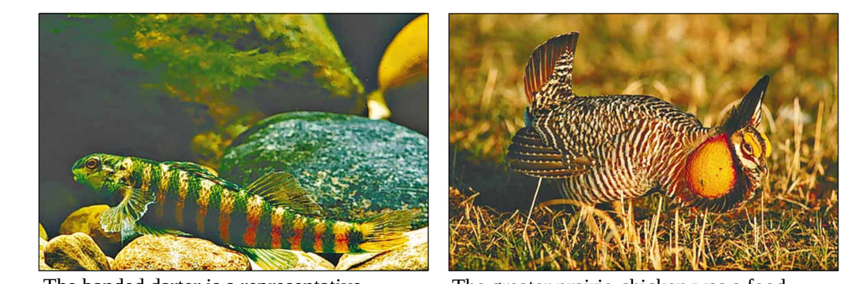
Wooded, relict sand dunes are common in Ecoregion 54d.

54a The **Illinois/Indiana Prairies** ecoregion is undulating and characterized by dark, very fertile soils. Today, corn, soybean, and livestock farming has replaced the original prairie and oak-hickory forest; woodland is largely confined to riparian areas. Low gradient, silt-bottomed streams have cut into the limy glacial and lacustrine deposits of Ecoregion 54a; they are warm in the summer, impacted by field runoff and channelization, and often carry a large amount of suspended sediment.

54b The **Chicago Lake Plain** ecoregion is a nearly level coastal strip with beach ridges, marshy swales, and sand dunes. It is differentiated from inland ecoregions by its lake-moderated climate and native beach-dune plant communities. Ecoregion 54b has lower dunes, fewer woodlands, and more urban-industrial activity than Ecoregion 56d.

54c The **Kankakee Marsh** ecoregion was once covered by extensive northern swamp forests, wet prairies, and bulrush-cattail marshes. Today, most of these distinctive communities are gone and only a narrow wooded corridor remains along the Kankakee River. Elsewhere, corn, soybean, and livestock farming is dominant on artificially drained soils that were derived from outwash deposits.

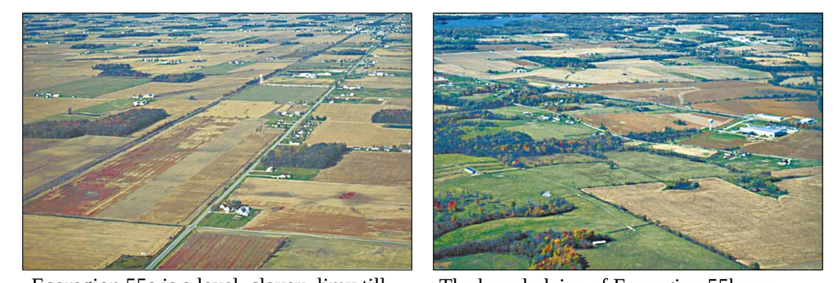
54d The **Kankakee Sand Area** ecoregion is distinguished from adjacent ecoregions by its extensive sand plains and relict dunes. Natural soil drainage properties and vegetation were distinctive; dry prairies and mixed oak savannas occurred on well-drained sites while northern swamp forests, marshes, or wet prairies grew on moister soils. Today, the dunes remain wooded. Crop productivity is lower than in Ecoregion 54b.


The banded darter is a representative species of Ecoregion 54a.
Photo: Mac Albin, Columbus Metro-Parks

The greater prairie-chicken was a food source for settlers. It was common in Ecoregion 54a but now is extirpated from Indiana due to habitat loss and hunting.
Photo: Mike Blair, Kansas Dept. of Wildlife and Parks

55. Eastern Corn Belt Plains

Ecoregion 55 is primarily a rolling till plain with local end moraines. It has lighter colored soils than Ecoregion 54, loamier and better drained soils than Ecoregion 57, and richer soils than Ecoregion 61. Glacial deposits of Wisconsinan age are extensive; they are not as dissected nor as leached as the pre-Wisconsinan till which is restricted to the southern part of Ecoregion 55. Originally, natural tree cover was greater than Ecoregion 54; beech forests were common on Wisconsinan soils while beech forests and elm-ash swamp forests dominated the wetter pre-Wisconsinan soils. Today, extensive corn, soybean, and livestock production occurs and has affected stream chemistry and turbidity.


Ecoregion 55a is a level, clayey, limy till plain. Its agricultural soils need artificial drainage.

The broad plains of Ecoregion 55b are made up of loamy, calcareous till. They were forested but now support corn, soybean, and livestock farming.


Large agricultural fields and very limited woodland are typical of Ecoregion 55e.

Cold water streams such as the Mad River are typical of Ecoregion 55c.

55a The **Clayey, High Lime Till Plains** ecoregion is transitional between the Loamy, High Lime Till Plains (55b) and the Maumee Lake Plains (57a); soils are less productive and more artificially drained than Ecoregion 55b and supported fewer swampy areas than Ecoregion 57a. Corn, soybean, wheat, and livestock farming is dominant and has replaced the original beech forests and scattered elm-ash swamp forests. No exceptional fish communities exist in the turbid, low gradient streams of Ecoregion 55a.

55b The **Loamy, High Lime Till Plains** ecoregion contains soils that developed from loamy, limy, glacial deposits of Wisconsinan age; these soils typically have better natural drainage than those of Ecoregion 55a and have more natural fertility than those of Ecoregion 55d. Beech forests, oak-sugar maple forests, and elm-ash swamp forests grew on the nearly level terrain; today, corn, soybean, and livestock production is widespread.

55c The **Mad River Interlobate Area** ecoregion is flanked by end moraines and received concentrated outwash deposits that filled preglacial valleys. Abundant ground water feeds its distinctive cold water streams that contain an abundance of riffle-inhabiting fish species. Originally, beech forest, mixed oak forest, and extensive fresh water fens/wet prairies were common in Ecoregion 55c. Today, extensive corn, soybean, dairy, and livestock farms as well as urban activity occur. Woodland still grows on steep sites and along

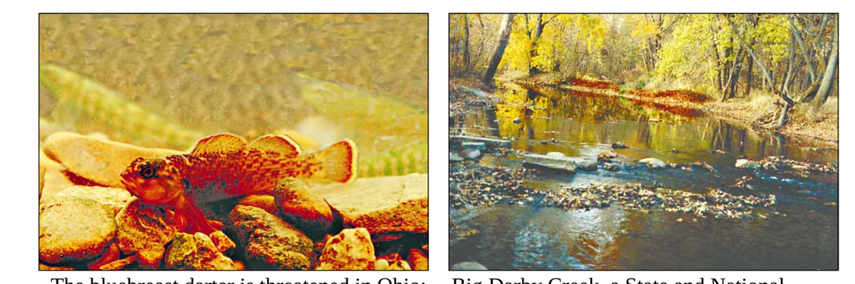
55d The **Pre-Wisconsinan Drift Plains** ecoregion is differentiated from the surrounding ecoregions by its deeply-leached, acidic, pre-Wisconsinan till and thin loess; widespread areas of nearly flat, very poorly-drained soils with fragipans are also distinctive. In addition, some dissected areas occur. Streams often have more sustained runoff and biotic diversity than those of Ecoregion 55b. Originally, beech forests and elm-ash swamp forests were dominant. Today, soybeans are common and are well adapted to spring soil wetness; corn, tobacco, and livestock farming also occurs.

55e The **Darby Plains** ecoregion once had a distinct assemblage of mixed oak forest; many prairies occurred on its end moraines, gravel-filled preglacial valleys, and seasonally wet areas. Today, tree density is less than in Ecoregion 55b and very large, productive crop and livestock farms occur on its level to undulating terrain. Big Darby Creek, a State and National Scenic River, has high fish diversity.

55f The **Whitewater Interlobate Area** ecoregion has distinctive cool water, coarse-bottomed streams that are perennial and fed by abundant ground water. The redside dace, northern stud fish, and banded sculpin occur; they are absent or uncommon in Ecoregion 55b. Unique Ozarkian invertebrates also occur in Ecoregion 55f. Dolomitic drift and meltwater deposits are characteristic and overlie limestone, calcareous shale, and


Originally, the tree sparrow was common in Ecoregion 55b. Since 1940, it has declined due, partly, to a loss of wintering habitat.
Photo: Mac Albin, Columbus Metro-Parks

Corn crops are less common on the leached soils of Ecoregion 55d than elsewhere in Ecoregion 55.


The bluebreast darter is threatened in Ohio; it occurs in the swift, rocky riffles of Big Darby Creek, a State and National Scenic River in Ecoregion 55e.
Photo: Roger F. Thoma, Ohio EPA

Big Darby Creek, a State and National Scenic River in Ecoregion 55e, has a high fish diversity.
Photo: Ohio Chapter, American Fisheries Society

56. Southern Michigan/Northern Indiana Drift Plains


Ecoregion 56a is a hummocky morainal area with cropland, woodlots, and many lakes.


Marsh wrens are found among the tall marsh grasses, cattails, rushes, and sedges of Ecoregion 56's remaining wetlands.
Photo: Indiana Dunes National Lakeshore


The spotted turtle lives in still, clear, shallow and vegetated water; it is threatened in Indiana but occurs in Ecoregions 56a and 56d.
Photo: Indiana Dunes National Lakeshore

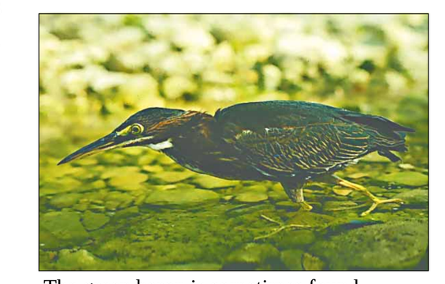
Ecoregion 56 is distinguished from adjacent ecoregions by its many lakes and marshes as well as its wider assortment of landforms, soil types, soil textures, and land uses. Broad till plains with thick and complex deposits of drift, paleobeach ridges, relict dunes, morainal hills, kames, drumlins, meltwater channels, and kettles occur. Feed grain, soybean, and livestock farming as well as woodlots, quarries, recreational development, and urban-industrial areas are common. An assortment of soils developed under oak-hickory forests, northern swamp forests, or beech forests. Bogs and bog soils are also locally common. Low to medium gradient streams occur and often have rocky bottoms and low amounts of suspended sediment.

56a The **Lake Country** ecoregion is a hummocky and pitted morainal area characterized by many pothole lakes, ponds, marshes, bogs, and clear streams. The well-drained end moraines and kames once supported oak-hickory forests whereas wetter areas had beech forests or northern swamp forests; the very poorly-drained kettles had tamarack swamp, cattail-bulrush marshes, or sphagnum bogs. Today, marshes and woodland remain but corn, soybean, and livestock farming is dominant; recreational and residential developments commonly surround the lakes of Ecoregion 56a.

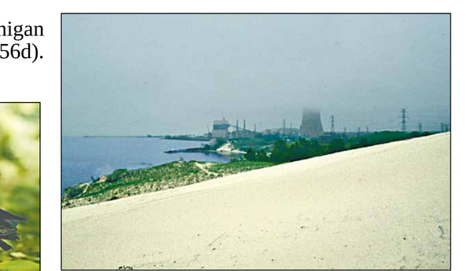
56b The **Elkhart Till Plains** ecoregion is punctuated by end moraines, kames, and lacustrine flats; kettlehole lakes occur but are much rarer than in Ecoregion 56a while sand dunes are less common than in Ecoregions 54d or 56d. Oak-hickory forests and beech maple forests once dominated Ecoregion 56b but, today, corn, soybean, and wheat farming is more extensive than woodland. Land use is more diversified than in the Eastern Corn Belt

56c The **Middle Tippecanoe Plains** ecoregion is level to rolling and covered by ground moraine, dunes, end moraines, and lacustrine deposits. The Tippecanoe River drains this area and has cooler water and greater species diversity than found in adjacent areas of Ecoregions 54 and 55. Its cold water tributaries are fed by abundant ground water; their temperature and fish fauna are distinct from those of Ecoregion 56b.

56d The **Michigan Lake Plain** ecoregion is a sandy coastal strip with beaches, high dunes, beach ridges, mucky interdunal depressions, and swales. Its lake-moderated climate as well as its beach and dune plant communities differentiate it from inland ecoregions. Ecoregion 56d has greater relief, higher woodland density, more conifers in its savanna community, and less made-land than the Chicago Lake Plain (54b). Urban and industrial activity as well as fruit and vegetable farming occurs; scattered woodland grows on the lee side of dunes and in some poorly-drained areas.


The green heron is sometimes found near ponds or along wooded streams in Ecoregion 56a.
Photo: Mac Albin, Columbus Metro-Parks

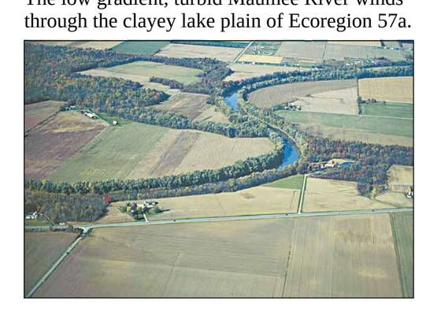
High dunes are common on the Michigan Lake Plain (56d).




The Tippecanoe darter is found in riffle reaches of Ecoregion 56c's coarse-bottomed streams. It is endangered in Indiana.
Photo: Smithsonian Institution, NMNH, Division of Fishes

57. Huron/Erie Lake Plains

The low gradient, turbid Maumee River winds through the clayey lake plain of Ecoregion 57a.



The flathead catfish occurs in the Maumee River of Ecoregion 57a.
Photo: Paul Vandermeer, Ohio EPA


Ecoregion 57b's old, well-drained dunes support mixed oak forest and savanna.

Ecoregion 57 is a broad, fertile, nearly flat plain punctuated by relict sand dunes, beach ridges, and end moraines. Originally, soil drainage was typically poorer than in Ecoregion 55 and elm-ash swamp and beech forests were dominant. Oak savanna was typically restricted to sandy, well-drained dunes and beach ridges. Today, most of the area has been cleared and artificially drained and contains highly productive farms producing corn, soybeans, livestock, and vegetables; urban and industrial areas are also extensive. Stream habitat and quality have been degraded by channelization, ditching, and agricultural activities.

57a The **Maumee Lake Plains** ecoregion is poorly-drained and contains clayey lake deposits, water-worked glacial till, and fertile soils. Elm-ash swamp forests and beech forests once were extensive; marshes and bogs occurred along the coast. They have been replaced by productive, drained farmland. Sluggish, low gradient rivers wind through Ecoregion 57a and have high suspended sediment loads of clayey silts that endanger biota.

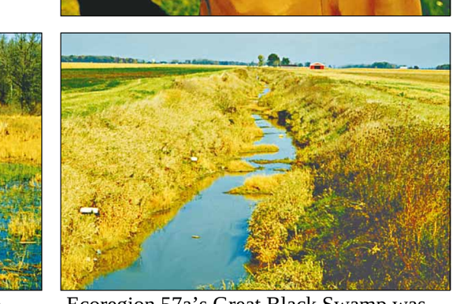
57b The **Oak Openings** ecoregion is a belt of low, often wooded, sand dunes and paleobeach ridges that are situated among the broad, nearly flat, agricultural plains of Ecoregion 57a. Well-drained, sandy soils are common and originally supported mixed oak forests and oak savanna; poorly-drained depressions with wet prairies were also found. Today, general farms, residential development, oak woodland, and sand quarries occur.

57c The **Paulding Plains** ecoregion is a part of the lake plain and is characterized by clayey lacustrine sediment and extensive, very poorly-drained, illitic soils such as the Paulding and Roselms. The nearly level, level, and depressional topography supported mostly elm-ash swamp forest but now has been cleared and drained for soybean, small grain, corn, and hay farming. Its very sluggish, low-gradient streams and many ditches are typically turbid and have very high loads of suspended clay that endanger biota.

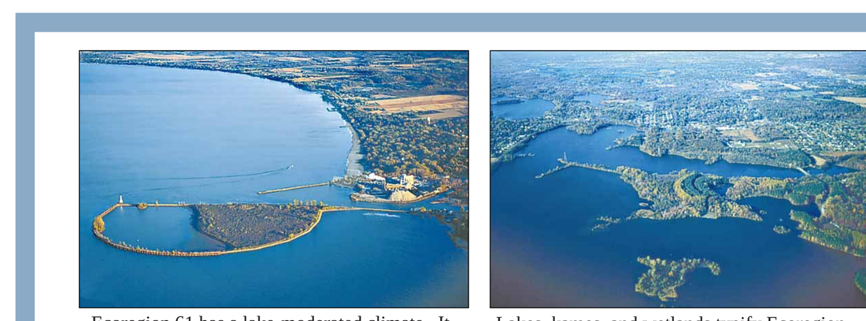
57d The **Marblehead Drift/Limestone Plain** ecoregion has areas of thin glacial drift and limestone-dolomite ridges and islands. Streams often flow on carbonate bedrock; their character is different from the clayey channels of Ecoregions 57a and 57c. Originally, beech forests and, especially, elm-ash swamp forests were common. Scattered carbonate ridges supported distinctive mixed oak forests and prairies, marl plains had prairies, and the Lake Erie and Sandusky Bay shoreline often supported fens. Many geographically isolated plant species occurred in Ecoregion 57d. Today, corn, small grains, soybeans, and hay are grown on artificially drained land. Vegetable and fruit farming is well adapted to the relatively mild climate near the shoreline.

Greater redhorses are endangered in Ohio. They are now most viable in the Sandusky River in Ecoregion 57d where they were found by the Ohio EPA in 1981.
Photo: Brian Alsdorf, Ohio EPA near Abbots Bridge, Seneca County


Ecoregion 57b has poorly drained areas, such as the Irwin Prairie, Lucas County.
Photo: Brian Alsdorf, Ohio EPA


Ecoregion 57a's Great Black Swamp was cleared and drained. Eckert Ditch, Wood County, is shown.
Photo: Brian Alsdorf, Ohio EPA

61. Erie/Ontario Drift and Lake Plain


Ecoregion 61 has a lake-moderated climate. It has a longer growing season, more snowfall, and more winter cloudiness than inland areas.

Lakes, kames, and wetlands typify Ecoregion 61e. The Portage Lakes, Summit County, are shown.


Rolling and hummocky terrain, dairy farms, and rural residential development are characteristic of Ecoregion 61c.

The Erie Gorges (61d) have high relief, bedrock exposures, and high fluvial erosion rates. The Chagrin River is shown.
Photo: Brian Alsdorf, Ohio EPA

Low lime drift and lacustrine deposits blanket the rolling to level terrain of Ecoregion 61. Lakes, wetlands, and swampy streams occur where stream networks are deranged or where the land is flat and clayey. Soils are often lower in carbonate and naturally less fertile than those of other glaciated ecoregions. Urban development, industrial activity, and agriculture are widespread and scattered woodland also occurs. Lake Erie's influence substantially increases the growing season, winter cloudiness, and snowfall of the northernmost areas.

61a The **Erie Lake Plain** ecoregion is a nearly level coastal strip of lacustrine deposits punctuated by beach ridges and swales. Its lake-modified climate sets it apart from other nearby ecoregions and its annual growing season is often several weeks longer than inland areas. Urban-industrial sites, ports, fruit-vegetable farms, and nurseries have developed on the plain.

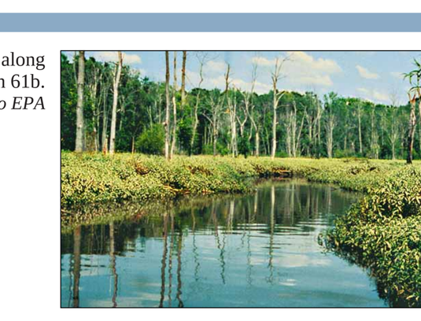
61b The **Mosquito Creek/Pymatuning Lowlands** ecoregion is characterized by poor drainage, wetlands, low-gradient streams, and moisture tolerant woodlands. It is nearly flat and is underlain by clayey till and fine lacustrine deposits. Originally, beech forests were common; today dairy farms and woodlots occur.

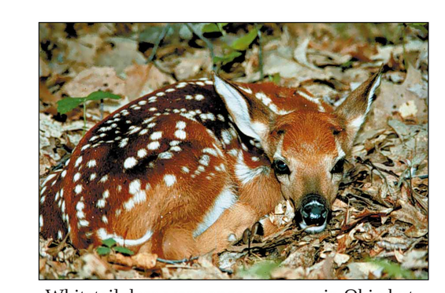
61c The **Low Lime Drift Plain** ecoregion has a rolling landscape composed of low rounded hills with scattered end moraines and kettles; its terrain is distinct from the unglaciated, wooded, hilly country of Ecoregion 70 and its soils are usually less naturally fertile than the high lime till plains of Ecoregion 55. Urban-industrial activity as well as dairy, livestock, corn, and soybean farming are common; many ridges and lowlands are wooded. The growing season is shorter than that of Ecoregion 61a, and progressively decreases away from Lake Erie.

61d The **Erie Gorges** ecoregion is a uniquely steep, dissected area along the Chagrin, Cuyahoga, and Grand rivers. Local relief can exceed 500 feet, rock exposures occur, and fluvial erosion rates are high. Originally, mixed mesophytic forests were common on well-drained sites; today, woodland, recreational areas, scattered farms, and housing are dominant.

61e The **Summit Interlobate Area** is set apart from adjacent ecoregions by its numerous lakes, wetlands, sphagnum bogs, sluggish streams, kames, and kettles. The substrate is often sandy outwash and till. Mixed oak forests originally dominated well-drained areas; today, woodland, peatland, agriculture, gravel quarries, and urban-suburban development occurs.

Poorly drained, nearly level lowlands along swampy Pymatuning Creek in Ecoregion 61b.
Photo: Brian Alsdorf, Ohio EPA



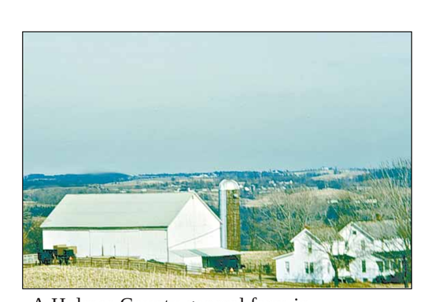

Whitetail deer were once common in Ohio but were hunted-out by 1904. Now reestablished and managed, they occur in many ecoregions.


The Summit Interlobate Area (61e) has many lakes and wetlands.

70. Western Allegheny Plateau


The dissected plateau of Ecoregion 70e and its mosaic of dairy, livestock, and general farms and woodland.

Ecoregion 70b has surface bituminous coal mines, reclaimed land, and disturbed drainage.


A Holmes County general farm in unglaciated Ecoregion 70e.


The rosyside dace is threatened in Ohio but is locally abundant in Ecoregion 70d.
Photo: Raymond F. Jezerinac

The hilly and wooded terrain of Ecoregion 70 was not muted by glaciation and is more rugged than the agricultural till plains of Ecoregions 55 and 61. Extensive mixed mesophytic forests and mixed oak forests originally grew in Ecoregion 70. Today, most of its rounded hills remain in forest; dairy, livestock, and general farms as well as residential developments are concentrated in the valleys. Horizontally-bedded, sedimentary rock underlies the region and has been mined for bituminous coal.

70a The **Permian Hills** ecoregion is rugged, wooded, and, commonly, too steep to be farmed. High gradient streams without acidity problems are characteristic and have developed on the underlying Permian shale, sandstone, and coal; on shale, the streams are often ephemeral and without large riffle-inhabiting fish populations.

70b The **Monongahela Transition Zone** has rounded hills and ridges that are generally less rugged than Ecoregion 70a but are still steep. Unstable, clayey regolith has developed on the underlying coal bearing strata but is largely absent from Ecoregions 70c, 70d, and 70f. Gas wells, coal mining, and reclaimed land are locally extensive and associated stream degradation is common. Forests occupy steeper areas; dairy, livestock, and general farms also occur.

70c The **Pittsburgh Low Plateau** ecoregion has rounded, forested hills and narrow, agricultural valleys; it is largely unglaciated in contrast to neighboring Ecoregion 61c. Medium textured soils are common and are markedly different from the clayey soils of Ecoregion 70b. High gradient streams with rocky bottoms and associated fauna contrast with the lower gradient, silty or sandy channels of Ecoregion 70e. Coal mining and associated stream acidity problems are present but less common than in Ecoregions 70b and 70e.

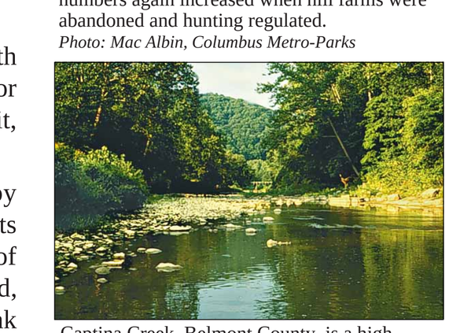
70d The **Lower Scioto Dissected Plateau** ecoregion is rugged, dissected, and underlain by Mississippian-age shale and sandstone. It is characterized by steep ridges, high relief, and streams without acidity problems. Low gradient, broad valleys also occur. Originally, mixed oak forests and mixed mesophytic forests were widespread and bottomland hardwood forests were restricted to broad, flat-bottomed valleys. Today, the steep areas are still wooded; livestock, general, and tobacco farming occurs in less rugged areas.

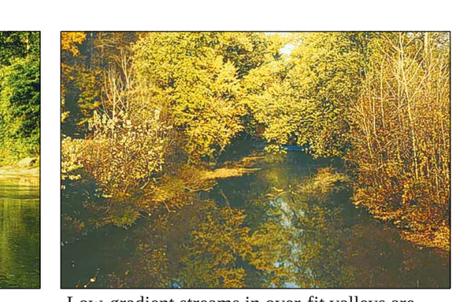
70e The **Unglaciated Upper Muskingum Basin** ecoregion is a dissected plateau with streams that are less degraded by coal mine effluent than those of Ecoregions 70b or 70f. Originally, mixed oak forests and mixed mesophytic forests were widespread. Underfit, low gradient rivers occur in broad, silt-filled, Wisconsinan-age valleys.

70f The **Ohio/Kentucky Carboniferous Plateau** ecoregion is characterized by extensive bituminous coal mining and associated stream degradation; mining and its effects are less prominent in Ecoregion 70e and absent from Ecoregion 70d. The ridges of Ecoregion 70f are forested while its floodplains and broad, clay-filled, flat-bottomed, preglacial valleys are used for general farms. Originally, the hill slopes had mixed oak forests, while the broad, Teays-age valleys supported mixed mesophytic forests.

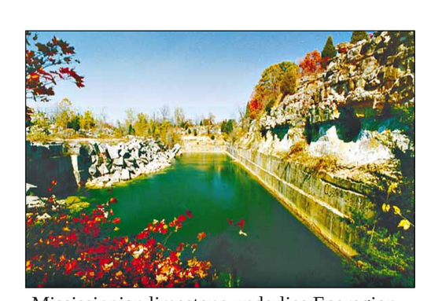

The ruffed grouse initially benefited from forest segmentation but habitat reduction and hunting later reduced its population. After 1930, its numbers again increased when hill farms were abandoned and hunting regulated.
Photo: Mac Albin, Columbus Metro-Parks

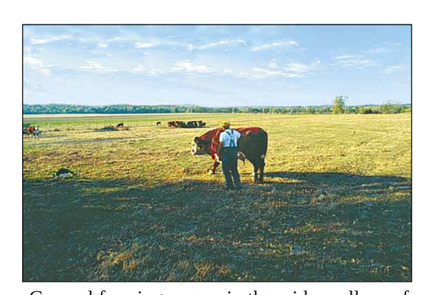

The acidified Leading Creek in Ecoregion 70b is downstream of bituminous coal mines.
Photo: Edward T. Rankin, Ohio EPA


Captina Creek, Belmont County, is a high gradient stream typical of Ecoregion 70a.
Photo: Roger F. Thoma, Ohio EPA


Low-gradient streams in over-fit valleys are locally common in Ecoregion 70e.

71. Interior Plateau


Mississippian limestone underlies Ecoregion 71b. It is extensively quarried.


General farming occurs in the wider valleys of Ecoregion 71a; forests are common elsewhere.

Ecoregion 71 has rolling to deeply dissected, rugged terrain with areas of karst topography common on the Mitchell Plain (71b). Maximum elevations and local relief are greater than in Ecoregion 72. The original forest vegetation shared its beech component with Ecoregion 55 and oak-hickory forests occurred on the well-drained, upper slopes. The soils of Ecoregion 71 developed from the underlying sandstone, siltstone, shale, and limestone and are not from till like those of Ecoregion 55. Land use/land cover is a transition between the crop and livestock farms of Ecoregion 55 and the forests of Ecoregion 70; hay, grain, cattle, hog, and poultry farming occurs and woodland is common.

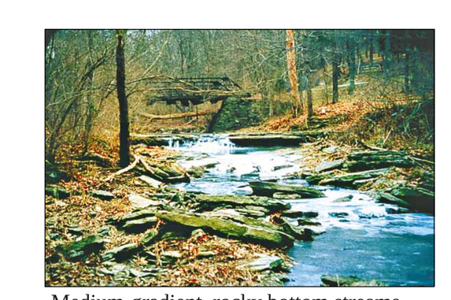
71a The **Crawford Uplands** ecoregion is heavily dissected by medium to high gradient streams and is more rugged and wooded than Ecoregion 71b. Oaks are found on well-drained upper slopes, mixed mesophytic forest occurs in coves as well as on north facing slopes, and specialized plant communities dominate the eastern sandstone-limestone cliffs. General farms occur especially in the west and in the wider valleys.

71b The **Mitchell Plain** is differentiated from adjacent ecoregions by its karst topography, low relief, residential-urban areas, and limestone quarries; its peripheral hills are wooded. The north experienced pre-Wisconsinan glaciation and is flatter and more poorly-drained than the unglaciated part which is dominated by sink holes, underground drainage, and terra rossa soils. Soils are leached and largely developed from loess and limestone. Western mesophytic forests were once dominant; karst wetland communities and limestone glades also occurred and were the major examples of these communities in Indiana.

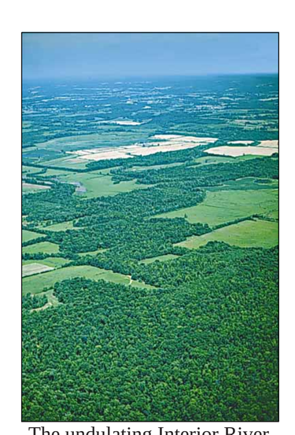
71c The **Norman Upland** ecoregion is mostly forested in contrast to Ecoregions 55b, 55d, and 71b which are adjacent and less rugged. It is characterized by dissected high hills and knobs, narrow valleys, and medium to high gradient streams. The silt loam soils were derived from loess, siltstone, shale, or sandstone. Originally, oak-hickory forests grew on the uplands and beech forests were found in the valleys. Today, chestnut oak has replaced American chestnut on the well-drained upper slopes; Virginia pine grows on the southern uplands.

71d The **Northern Bluegrass** ecoregion is deeply dissected and has some ephemeral streams in the east. The east is unglaciated whereas the plains and hills of the west are mantled by leached pre-Wisconsinan till and discontinuous loess. Ecoregion 71d is underlain by Ordovician limestone and shale which distinguishes it from other nearby ecoregions. Its lower crestal elevations, Alfisol soils, limestone bedrock, and sinkholes distinguish it from Ecoregion 70d; its ruggedness, lack of fragipans, and, often, natural vegetation differentiate it from the glaciated plains of Ecoregion 55d. In addition, Ecoregion 71d lacks the high lime, Wisconsinan till of Ecoregion 55b. Originally, in Ohio, mixed mesophytic forests, mixed oak forests, and bottomland hardwood forests grew; in Indiana, western mixed mesophytic forests and oak-hickory forests grew and they lacked many northern species. Today, the ecoregion is a mosaic of forest and agriculture with urban-industrial activity occurring near Cincinnati and along the Ohio River. It is wooded where steep; general, dairy, and tobacco farming occurs on less rugged sites.


Extensive woodland typifies Ecoregion 71c and is visible from Hickory Ridge, Jackson County.


Medium-gradient, rocky bottom streams with pools and good fish habitat occur in Ecoregion 71d. Briarly Creek, Hamilton County, is shown.

72. Interior River Lowland


The undulating Interior River Lowland (72) and its cropland and scattered woodland.


The soils of Ecoregion 72b produce corn and soybeans and benefit from lime applications.

This broad, undulating lowland was formed in non-resistant, non-calcareous sedimentary rock. Large upland areas along the Wabash River are veneered by windblown material which thins eastward. Pre-Wisconsinan ice once covered much of the ecoregion and till deposits can be found locally north of the White River. Many wide, flat-bottomed, terraced valleys occur and are filled with alluvium as well as outwash, aeolian, and lacustrine deposits. Bottomland hardwood forests, swamps, and beech forests once grew on poorly-drained, nearly level sites along the Wabash and Ohio rivers whereas the upland areas had beech forests and oak-hickory forests. Patterns of land use are more varied than in the neighboring ecoregions. Drained alluvial soils are farmed for feed grains and soybeans. Undrained valley sites are used for forage crops, pasture, or woodlots; upland soils are used for mixed farming and livestock. Extensive strip mining as well as crop and livestock production have impacted stream water quality and stream habitat; sheet erosion can be severe on cultivated slopes.

72a The **Wabash Bottomlands** ecoregion is found along the lower Wabash and Ohio rivers. Ecoregion 72a contains the most pronounced Mississippian-type biotic assemblage in Indiana and, historically, significant numbers of waterfowl have wintered here. The low, nearly level flood plains, terraces, and bayous are composed of alluvial and outwash deposits; they were seasonally inundated before flood control and were once covered by bottomland hardwood forests. Today, some woodland remains but, mostly, the land is used for corn, soybean, wheat, alfalfa, or livestock farming; poor drainage and droughtiness are critical factors controlling land use.

72b The **Glaciated Wabash Lowlands** ecoregion is often mantled by till or windblown silt and sand. The loamy to sandy till deposits are pre-Wisconsinan in age and are older and more leached than the glacial drift of Ecoregions 54a and 55b. The original vegetation included beech forest and oak-hickory forest; relict sand dunes sometimes supported prairies. Today, the productive soils support corn, soybean, wheat, and vegetable farming; scattered woodlands and surface coal mines also occur. Many streams have gravel bottoms, riffles, and associated fauna; they are less sluggish than the streams of Ecoregion 72c.

72c The **Southern Wabash Lowlands** ecoregion is undulating to rolling and has many wide, shallow valleys. It lies to the south of Ecoregion 72b and its pre-Wisconsinan till plain; relict dunes and wind-blown silt deposits occur in the west, and shale and sandstone bedrock is exposed in the east. Ecoregion 72c is further characterized by its long growing season and neutral to acid soils. Originally, oak-hickory forests grew on the well-drained upland soils while western mesophytic forests occurred on more poorly-drained soils; some southern plants reached their northern distributional limit in Ecoregion 72c. Today, the woodland has been mostly cleared for corn, soybean, wheat, livestock, and vegetable farming as well as extensive surface coal mines.


Surface bituminous coal mines and cropland are common in Ecoregion 72c.


Draglines, surface coal mines, and corn farming are common in Ecoregion 72c.